SEQUENCE LISTING

<110> University of Florida Research Foundation, Inc.
Klee, Harry J.
Tieman, Denise

<120> Materials and Methods for Synthesis of a Flavor and Aroma Volatile in Plants

<130> UF-386CXC1

<160> 13

<170> PatentIn version 3.2

<210> 1
<211> 1367
<212> DNA
<213> Lycopersicon esculentum

<400> 1
gcccttctaa tacgactcac tatagggcaa gcagtggtaa caacgcagag tacgcggggg 60

aaggataatc tctcaaatta ctttcttttt ttttcctatc aattctttat accaaaataa 120

tattattgtt tttttctcct ctgtttctgc ttcgtatttt tgctgagaga aatgagtgtg 180

acagcgaaaa cagtgtgtgt aacaggagct tcaggttaca tagcttcatg gctagtcaaa 240

ttcttgctac atagtggtta caatgtgaag gcttctgttc gtgatccaaa tgatcccaag 300

aaaacgcagc acttgctttc tcttggtggg gccaaggaga ggcttcactt gttcaaagca 360

aacctattag aagaaggttc atttgatgct gtagttgatg gatgtgaagg tgtattccat 420

acagcgtctc ctttttacta ctctgttaca gacccacagg ctgaattact tgatcctgct 480

gttaagggaa cactcaatct tctcgggtca tgtgccaaag caccatcagt aaaacgagtt 540

gttttaacgt cttccatagc tgcagttgct tacagtggtc agcctcggac acctgaggtt 600

gtggttgatg agagctggtg gaccagtcca gactactgca aagaaaaaca gctctggtat 660

gtcctctcaa agacattggc tgaggatgct gcgtggaagt ttgtgaagga gaaaggcatt 720

gatatggttg tagtaaaccc tgctatggtt attggtcctc tgttacagcc tacacttaat 780

accagttctg ctgcagtctt gagcttggta aatggtgctg agacataccc aaattcctct 840

tttgggtggg ttaacgtgaa agatgttgca aatgcacata ttcttgcatt tgagaaccct 900

tcagctaatg ggagatactt aatggttgag agggttgcac actattctga tatattgaag 960

atattgcgtg acctttatcc tactatgcaa cttccagaaa agtgtgctga tgacaaccca 1020

ttgatgcaaa attatcaagt atcaaaggag aaggcaaaaa gcttgggtat tgagtttact 1080

acccttgaag aaagcatcaa agaaactgtt gaaagtttga aggaaaagaa gtttttttgga 1140

ggttcatctt ctatgtaaaa ggcttctcaa agcttttatg gttttgttga acaatactac 1200

ccacccccacc ctaccctaca cacttttttt ttttacttct tttagctaat tatagaatca 1260

agaagtcgaa tggtatatcc gttaataaat ttcgatcaga tgaggttgaa atttgttcta 1320

tatctagaga tttttacaga ctggtttgat agaaaaaaaa aaaaaaa 1367

<210> 2
<211> 328
<212> PRT
<213> Lycopersicon esculentum

<400> 2

Met Ser Val Thr Ala Lys Thr Val Cys Val Thr Gly Ala Ser Gly Tyr
1 5 10 15

Ile Ala Ser Trp Leu Val Lys Phe Leu Leu His Ser Gly Tyr Asn Val
20 25 30

Lys Ala Ser Val Arg Asp Pro Asn Asp Pro Lys Lys Thr Gln His Leu
35 40 45

Leu Ser Leu Gly Gly Ala Lys Glu Arg Leu His Leu Phe Lys Ala Asn
50 55 60

Leu Leu Glu Glu Gly Ser Phe Asp Ala Val Val Asp Gly Cys Glu Gly
65 70 75 80

Val Phe His Thr Ala Ser Pro Phe Tyr Tyr Ser Val Thr Asp Pro Gln
85 90 95

Ala Glu Leu Leu Asp Pro Ala Val Lys Gly Thr Leu Asn Leu Leu Gly
100 105 110

Ser Cys Ala Lys Ala Pro Ser Val Lys Arg Val Val Leu Thr Ser Ser
115 120 125

Ile Ala Ala Val Ala Tyr Ser Gly Gln Pro Arg Thr Pro Glu Val Val
130 135 140

Val Asp Glu Ser Trp Trp Thr Ser Pro Asp Tyr Cys Lys Glu Lys Gln
145 150 155 160

Leu Trp Tyr Val Leu Ser Lys Thr Leu Ala Glu Asp Ala Ala Trp Lys
165 170 175

Phe Val Lys Glu Lys Gly Ile Asp Met Val Val Val Asn Pro Ala Met
180 185 190

Val Ile Gly Pro Leu Leu Gln Pro Thr Leu Asn Thr Ser Ser Ala Ala
195 200 205

Val Leu Ser Leu Val Asn Gly Ala Glu Thr Tyr Pro Asn Ser Ser Phe
210 215 220

Gly Trp Val Asn Val Lys Asp Val Ala Asn Ala His Ile Leu Ala Phe

225 230 235 240

Glu Asn Pro Ser Ala Asn Gly Arg Tyr Leu Met Val Glu Arg Val Ala
245 250 255

His Tyr Ser Asp Ile Leu Lys Ile Leu Arg Asp Leu Tyr Pro Thr Met
260 265 270

Gln Leu Pro Glu Lys Cys Ala Asp Asp Asn Pro Leu Met Gln Asn Tyr
275 280 285

Gln Val Ser Lys Glu Lys Ala Lys Ser Leu Gly Ile Glu Phe Thr Thr
290 295 300

Leu Glu Glu Ser Ile Lys Glu Thr Val Glu Ser Leu Lys Glu Lys Lys
305 310 315 320

Phe Phe Gly Gly Ser Ser Ser Met
325

<210> 3
<211> 35
<212> DNA
<213> Artificial sequence

<220>
<223> PCR primer

<400> 3
tccttggccc caccaagaga aagcaagtgc tgcgt 35

<210> 4
<211> 1398
<212> DNA
<213> Lycopersicon esculentum

<400> 4
atgggaagtt tatcatttga gaaggatttt gagccatcag caattactcc aagaggatta 60

gcaccacctg gattaattgt aaatggtgat tttggtgaaa tgatgagact taaggtgtca 120

tcaacaccaa caacaccaag aaaaaacttg aatctttcag tgacggagcc aggaaaaaat 180

gatggaccta gtttggattg tacattgatg aattatattg atacactcac ccaacgtatc 240

aactatcata tcggttatcc agttaacata tgttatgagc actatgctaa tttagcccca 300

cttttacaat ttcatttaaa taattgtggt gatccatttc ttcaaaatac tgtggatttt 360

cattcaaagg attttgaagt ggctgtttta aattggtttg ctgatttatg ggaaattgaa 420

agagatcaat attggggcta tgtaacaaat ggtggtactg aaggaaattt acatggcatt 480

ttggttggga gagaattgtt tccagatgga attttatatg catcaaaaga ctctcattac 540

tcagtggcta aggcagcaat gatgtataga atggattttg aaaatattaa cgcatcaata 600

aatggagaaa tcgattattc tgatttgaaa gttaaattac ttcaaaacaa gggaaaacca 660

gcgataatta atgttacaat tggcactact tttaaaggag ctgttgatga tcttgatgtt 720

attcttcaaa tacttgaaga gtgtggttac acacgagatc aattttatat tcattgtgat 780

gcagcactaa atggacttat tattcctttt attaaaaata tgattacttt caagaagcca 840

attggaagtg tgacaatttc tggtcacaag tttttgggat gtccaatgcc ttgtggagtt 900

caaataacaa ggaaaagtta cattaataac ctttcgagaa gagtcgaata tattgcttct 960

gtggatgcta caatttctgg aagtcgaaat ggtttgactc cgatcttctt atggtacagt 1020

ataagtgcta aaggtcaaat tggttttcag aaagacgtta agagatgttt tgacaatgct 1080

aagtacttga aagaccgtct tcagcaagca ggaatcagcg tcatgctgaa tgagcttagc 1140

atcatagttg tcctcgagag gcctcgtgac catgaattcg ttcgtcgttg gcaattatct 1200

tgtgtgagag atatggcaca tgttattgtt atgccaggca taactagaga aactcttgat 1260

ggttttatta atgatttgct tcaacaaagg aaaaaatggt atcaagatgg aagaattagc 1320

cctccttgtg ttgcaaatga tattggtgct caaaattgtg cttgctctta tcataaaatt 1380

gattacatta ttgcttag 1398

<210> 5
<211> 465
<212> PRT
<213> Lycopersicon esculentum

<400> 5

Met Gly Ser Leu Ser Phe Glu Lys Asp Phe Glu Pro Ser Ala Ile Thr
1 5 10 15

Pro Arg Gly Leu Ala Pro Pro Gly Leu Ile Val Asn Gly Asp Phe Gly
20 25 30

Glu Met Met Arg Leu Lys Val Ser Ser Thr Pro Thr Thr Pro Arg Lys
35 40 45

Asn Leu Asn Leu Ser Val Thr Glu Pro Gly Lys Asn Asp Gly Pro Ser
50 55 60

Leu Asp Cys Thr Leu Met Asn Tyr Ile Asp Thr Leu Thr Gln Arg Ile
65 70 75 80

Asn Tyr His Ile Gly Tyr Pro Val Asn Ile Cys Tyr Glu His Tyr Ala
85 90 95

Asn Leu Ala Pro Leu Leu Gln Phe His Leu Asn Asn Cys Gly Asp Pro
100 105 110

Phe Leu Gln Asn Thr Val Asp Phe His Ser Lys Asp Phe Glu Val Ala
115 120 125

```
Val Leu Asn Trp Phe Ala Asp Leu Trp Glu Ile Glu Arg Asp Gln Tyr
    130                 135                 140

Trp Gly Tyr Val Thr Asn Gly Gly Thr Glu Gly Asn Leu His Gly Ile
145                 150                 155                 160

Leu Val Gly Arg Glu Leu Phe Pro Asp Gly Ile Leu Tyr Ala Ser Lys
                165                 170                 175

Asp Ser His Tyr Ser Val Ala Lys Ala Ala Met Met Tyr Arg Met Asp
            180                 185                 190

Phe Glu Asn Ile Asn Ala Ser Ile Asn Gly Glu Ile Asp Tyr Ser Asp
        195                 200                 205

Leu Lys Val Lys Leu Leu Gln Asn Lys Gly Lys Pro Ala Ile Ile Asn
    210                 215                 220

Val Thr Ile Gly Thr Thr Phe Lys Gly Ala Val Asp Asp Leu Asp Val
225                 230                 235                 240

Ile Leu Gln Ile Leu Glu Glu Cys Gly Tyr Thr Arg Asp Gln Phe Tyr
                245                 250                 255

Ile His Cys Asp Ala Ala Leu Asn Gly Leu Ile Ile Pro Phe Ile Lys
            260                 265                 270

Asn Met Ile Thr Phe Lys Lys Pro Ile Gly Ser Val Thr Ile Ser Gly
        275                 280                 285

His Lys Phe Leu Gly Cys Pro Met Pro Cys Gly Val Gln Ile Thr Arg
    290                 295                 300

Lys Ser Tyr Ile Asn Asn Leu Ser Arg Arg Val Glu Tyr Ile Ala Ser
305                 310                 315                 320

Val Asp Ala Thr Ile Ser Gly Ser Arg Asn Gly Leu Thr Pro Ile Phe
                325                 330                 335

Leu Trp Tyr Ser Ile Ser Ala Lys Gly Gln Ile Gly Phe Gln Lys Asp
            340                 345                 350

Val Lys Arg Cys Phe Asp Asn Ala Lys Tyr Leu Lys Asp Arg Leu Gln
        355                 360                 365

Gln Ala Gly Ile Ser Val Met Leu Asn Glu Leu Ser Ile Ile Val Val
    370                 375                 380

Leu Glu Arg Pro Arg Asp His Glu Phe Val Arg Arg Trp Gln Leu Ser
385                 390                 395                 400

Cys Val Arg Asp Met Ala His Val Ile Val Met Pro Gly Ile Thr Arg
                405                 410                 415

Glu Thr Leu Asp Gly Phe Ile Asn Asp Leu Leu Gln Gln Arg Lys Lys
            420                 425                 430

Trp Tyr Gln Asp Gly Arg Ile Ser Pro Pro Cys Val Ala Asn Asp Ile
```

435 440 445

Gly Ala Gln Asn Cys Ala Cys Ser Tyr His Lys Ile Asp Tyr Ile Ile
450 455 460

Ala
465

<210> 6
<211> 1416
<212> DNA
<213> Lycopersicon esculentum

<400> 6
atgggtagtc tctcacttga aatggatttt gagccatcac ccatgacacc cagaagttta 60

gcagcgatga cacctagaag tttagcgcga cgacgattgt ttccgaacgt ggacaacaag 120

aaacagaaaa tggcacaacc aggtgcagga ccaaggaaga acttggaact tgaggtcatg 180

gagcctgcat tgaagaatga tggtccttct ttggacacta tcttggttaa ttatttggac 240

acacttacac aacgagtcaa ttatcattta ggttatccag tcaacatatg ttatgatcac 300

tatgcaacgc tagcaccact tttgcagttt cacctaaaca attgtggtga tcctttccta 360

caaaatactg tcgatttcca ttctaaagac tttgaagtgg ctgttttgaa ttggtttgca 420

aaactttggg aaattgaaaa ggatcaatat tggggatatg ttaccaatgg tggcaccgaa 480

ggcaatctcc atggtatttt gttagggaga gagctacttc ctgaaggaat attatatgca 540

tcaaaagact ctcattactc agtattcaaa gctgcaagaa tgtatagaat ggattcagaa 600

acaatcaaca catcagtaaa tggagagatg gattattcag atttaagagc aaagttactt 660

caaaataagg ataaaaccagc tattataaat gtcacaattg gaactacatt caaaggagca 720

atcgatgacc tggatgttat tcttgaaata ctcaaagaat gtggctattc acaagatcga 780

ttttacattc actgtgatgc agcactatgt ggtcttatga ccccttttat aaacaatatg 840

attagtttca agaagccaat tggaagtgtc acaatttctg gacacaagtt tttgggatgt 900

ccaatgcctt gtggtgtcca aataacaaga aaaagctaca tcaataatct ctcaacaaat 960

gtggaataca ttgcttctgt ggatgccact atttctggta gccgtaacgg tttaactcca 1020

attttcttat ggtatagctt gagcgcaaaa ggtcaagttg gacttcaaaa ggatgttaaa 1080

agatgtctcg acaatgccaa atatttgaaa gatcgtcttc aacaagcagg gataagtgtc 1140

atgctgaatg agctaagcat catagttgta cttgaaaggc ctcgtgacca tgaatttgtg 1200

cgtcgttggc aactctcatg cgtcaaggat atggcacatg ttattgtgat gccaggaatc 1260

acacgagaaa tgcttgacaa cttcatgagt gaattagtgc aacaaagaaa agtatggtat 1320

caaaatggaa agactgatcc tccttgtgtt ggagaggata ttggtgctca aaattgtgca 1380

tgctcttatc ataagattga ctacatctgt ccttag 1416

<210> 7
<211> 471
<212> PRT
<213> Lycopersicon esculentum

<400> 7

Met Gly Ser Leu Ser Leu Glu Met Asp Phe Glu Pro Ser Pro Met Thr
1 5 10 15

Pro Arg Ser Leu Ala Ala Met Thr Pro Arg Ser Leu Ala Arg Arg Arg
20 25 30

Leu Phe Pro Asn Val Asp Asn Lys Lys Gln Lys Met Ala Gln Pro Gly
35 40 45

Ala Gly Pro Arg Lys Asn Leu Glu Leu Glu Val Met Glu Pro Ala Leu
50 55 60

Lys Asn Asp Gly Pro Ser Leu Asp Thr Ile Leu Val Asn Tyr Leu Asp
65 70 75 80

Thr Leu Thr Gln Arg Val Asn Tyr His Leu Gly Tyr Pro Val Asn Ile
85 90 95

Cys Tyr Asp His Tyr Ala Thr Leu Ala Pro Leu Leu Gln Phe His Leu
100 105 110

Asn Asn Cys Gly Asp Pro Phe Leu Gln Asn Thr Val Asp Phe His Ser
115 120 125

Lys Asp Phe Glu Val Ala Val Leu Asn Trp Phe Ala Lys Leu Trp Glu
130 135 140

Ile Glu Lys Asp Gln Tyr Trp Gly Tyr Val Thr Asn Gly Gly Thr Glu
145 150 155 160

Gly Asn Leu His Gly Ile Leu Leu Gly Arg Glu Leu Leu Pro Glu Gly
165 170 175

Ile Leu Tyr Ala Ser Lys Asp Ser His Tyr Ser Val Phe Lys Ala Ala
180 185 190

Arg Met Tyr Arg Met Asp Ser Glu Thr Ile Asn Thr Ser Val Asn Gly
195 200 205

Glu Met Asp Tyr Ser Asp Leu Arg Ala Lys Leu Leu Gln Asn Lys Asp
210 215 220

Lys Pro Ala Ile Ile Asn Val Thr Ile Gly Thr Thr Phe Lys Gly Ala
225 230 235 240

Ile Asp Asp Leu Asp Val Ile Leu Glu Ile Leu Lys Glu Cys Gly Tyr
245 250 255

Ser Gln Asp Arg Phe Tyr Ile His Cys Asp Ala Ala Leu Cys Gly Leu
260 265 270

Met Thr Pro Phe Ile Asn Asn Met Ile Ser Phe Lys Lys Pro Ile Gly
275 280 285

Ser Val Thr Ile Ser Gly His Lys Phe Leu Gly Cys Pro Met Pro Cys
290 295 300

Gly Val Gln Ile Thr Arg Lys Ser Tyr Ile Asn Asn Leu Ser Thr Asn
305 310 315 320

Val Glu Tyr Ile Ala Ser Val Asp Ala Thr Ile Ser Gly Ser Arg Asn
325 330 335

Gly Leu Thr Pro Ile Phe Leu Trp Tyr Ser Leu Ser Ala Lys Gly Gln
340 345 350

Val Gly Leu Gln Lys Asp Val Lys Arg Cys Leu Asp Asn Ala Lys Tyr
355 360 365

Leu Lys Asp Arg Leu Gln Gln Ala Gly Ile Ser Val Met Leu Asn Glu
370 375 380

Leu Ser Ile Ile Val Val Leu Glu Arg Pro Arg Asp His Glu Phe Val
385 390 395 400

Arg Arg Trp Gln Leu Ser Cys Val Lys Asp Met Ala His Val Ile Val
405 410 415

Met Pro Gly Ile Thr Arg Glu Met Leu Asp Asn Phe Met Ser Glu Leu
420 425 430

Val Gln Gln Arg Lys Val Trp Tyr Gln Asn Gly Lys Thr Asp Pro Pro
435 440 445

Cys Val Gly Glu Asp Ile Gly Ala Gln Asn Cys Ala Cys Ser Tyr His
450 455 460

Lys Ile Asp Tyr Ile Cys Pro
465 470

<210> 8
<211> 1416
<212> DNA
<213> Lycopersicon esculentum

<400> 8
atgggtagtc tctcacttga aatggatttt gagccatcac ctatgacacc cagaagttta 60

gcagcgatga cacctagaag tttagcgcgg cgaagattgt ttcccaatgt ggacaacaaa 120

aaacaaaagg tgcaacaatc aggtgcaggg ccaaggaaga acttacaact tgaagtcatg 180

gaacctgcat tgaacaatgc tggtcctct ttggacacta tattggtcaa ttatttagac 240

acacttacac aacgagtcaa ttatcattta ggttatccag tcaacatttg ttatgatcac 300

tatgcaactt tagcaccact tttacagttt cacctaaaca attgtggtga tcctttccta 360

caaaacactg tcgatttcca ttctaaagac tttgaagtgg ctgttttgaa ttggtttgca 420

aaactatggg aaattgaaaa ggatcaatac tggggatatg ttaccaatgg tggcaccgaa 480

ggcaatctcc atggtatttt gttagggaga gagctacttc ctgatggaat attatatgcg 540

tcaaaagact ctcactattc ggtcttcaaa gctgcaagaa tgtatagaat ggattcagaa 600

acaatcaaca catcagtaaa cggagagatg gattattcag atttaagagc aaagttactt 660

caaaataagg ataaaccagc tattataaat gtcacaattg gaactacgtt caaaggagca 720

atcgatgacc tggatgttat tcttgaaaca ctcaaagaat gtggctattc gcaagatagg 780

ttttacatcc actgtgatgc tgcactatgt ggtcttatga ccccttttat aaacaatatg 840

attagtttca agaagccaat tggaagtgtc acaatttctg gacacaagtt tttgggatgt 900

ccaatgcctt gtggtgtcca aattacaaga aagagttaca tcaataatct ctcaacaaat 960

gtggaataca ttgcttctgt cgatgccact atttctggca gccgtaacgg tttaactcca 1020

attttcttgt ggtatagctt gagcgcaaaa ggtcaagttg gacttcaaaa ggatgttaaa 1080

agatgtctcg acaatgccaa atatttgaaa gatcgtcttc aaaaagcagg aataagtgtc 1140

atgttaaatg agcttagcat catagttgta cttgaaaggc ctcgtgacca tgaatttgtc 1200

cgtcgttggc aactctcatg cgtcaaggat atggcacatg ttattgtaat gccaggcatc 1260

acacgagaaa tgcttgacaa tttcacgagt gaattagtgc aacaaagaaa agtatggtat 1320

caaaatggac agaccaatcc tccttgtgtt ggagaggata ttggtgctca aaattgtgca 1380

tgctcttatc ataagattga ctacatctgt ccttag 1416

<210> 9
<211> 471
<212> PRT
<213> Lycopersicon esculentum

<400> 9

Met Gly Ser Leu Ser Leu Glu Met Asp Phe Glu Pro Ser Pro Met Thr
1 5 10 15

Pro Arg Ser Leu Ala Ala Met Thr Pro Arg Ser Leu Ala Arg Arg Arg
20 25 30

Leu Phe Pro Asn Val Asp Asn Lys Lys Gln Lys Val Gln Gln Ser Gly
35 40 45

Ala Gly Pro Arg Lys Asn Leu Gln Leu Glu Val Met Glu Pro Ala Leu
50 55 60

```
Asn Asn Ala Gly Pro Ser Leu Asp Thr Ile Leu Val Asn Tyr Leu Asp
65                  70                  75                  80

Thr Leu Thr Gln Arg Val Asn Tyr His Leu Gly Tyr Pro Val Asn Ile
                85                  90                  95

Cys Tyr Asp His Tyr Ala Thr Leu Ala Pro Leu Leu Gln Phe His Leu
            100                 105                 110

Asn Asn Cys Gly Asp Pro Phe Leu Gln Asn Thr Val Asp Phe His Ser
        115                 120                 125

Lys Asp Phe Glu Val Ala Val Leu Asn Trp Phe Ala Lys Leu Trp Glu
    130                 135                 140

Ile Glu Lys Asp Gln Tyr Trp Gly Tyr Val Thr Asn Gly Gly Thr Glu
145                 150                 155                 160

Gly Asn Leu His Gly Ile Leu Leu Gly Arg Glu Leu Leu Pro Asp Gly
                165                 170                 175

Ile Leu Tyr Ala Ser Lys Asp Ser His Tyr Ser Val Phe Lys Ala Ala
            180                 185                 190

Arg Met Tyr Arg Met Asp Ser Glu Thr Ile Asn Thr Ser Val Asn Gly
        195                 200                 205

Glu Met Asp Tyr Ser Asp Leu Arg Ala Lys Leu Leu Gln Asn Lys Asp
    210                 215                 220

Lys Pro Ala Ile Ile Asn Val Thr Ile Gly Thr Thr Phe Lys Gly Ala
225                 230                 235                 240

Ile Asp Asp Leu Asp Val Ile Leu Glu Thr Leu Lys Glu Cys Gly Tyr
                245                 250                 255

Ser Gln Asp Arg Phe Tyr Ile His Cys Asp Ala Ala Leu Cys Gly Leu
            260                 265                 270

Met Thr Pro Phe Ile Asn Asn Met Ile Ser Phe Lys Lys Pro Ile Gly
        275                 280                 285

Ser Val Thr Ile Ser Gly His Lys Phe Leu Gly Cys Pro Met Pro Cys
    290                 295                 300

Gly Val Gln Ile Thr Arg Lys Ser Tyr Ile Asn Asn Leu Ser Thr Asn
305                 310                 315                 320

Val Glu Tyr Ile Ala Ser Val Asp Ala Thr Ile Ser Gly Ser Arg Asn
                325                 330                 335

Gly Leu Thr Pro Ile Phe Leu Trp Tyr Ser Leu Ser Ala Lys Gly Gln
            340                 345                 350

Val Gly Leu Gln Lys Asp Val Lys Arg Cys Leu Asp Asn Ala Lys Tyr
        355                 360                 365

Leu Lys Asp Arg Leu Gln Lys Ala Gly Ile Ser Val Met Leu Asn Glu
    370                 375                 380
```

Leu Ser Ile Ile Val Val Leu Glu Arg Pro Arg Asp His Glu Phe Val
385 390 395 400

Arg Arg Trp Gln Leu Ser Cys Val Lys Asp Met Ala His Val Ile Val
405 410 415

Met Pro Gly Ile Thr Arg Glu Met Leu Asp Asn Phe Thr Ser Glu Leu
420 425 430

Val Gln Gln Arg Lys Val Trp Tyr Gln Asn Gly Gln Thr Asn Pro Pro
435 440 445

Cys Val Gly Glu Asp Ile Gly Ala Gln Asn Cys Ala Cys Ser Tyr His
450 455 460

Lys Ile Asp Tyr Ile Cys Pro
465 470

<210> 10
<211> 993
<212> DNA
<213> Lycopersicon esculentum

<400> 10
atgagtagtg tggcagcgac aaaaacagta tgtgtaacag gagcatcagg atacatagca 60

tcatggcttg tcaatttctt gcttcaacgt ggttacactg ttaaagcctc cgttcgtgac 120

cccaatgatc ccaagaaaac acagcatttg atctcgttag gtggggccaa ggagaggctt 180

cacttgttca aagcaaacct tttagaagag ggttcctttg atgctgtggt tgatggatgt 240

gaaggtgtat tccatacagc atcacctttt tactactctg ttacagaccc acaggctgaa 300

ttacttgatc cagctgttaa ggggacactc aatcttctcg gttcatgtgc caaagcacca 360

tcagtaaaac gtgtggtttt aacatcttcc atagctgcag ttgcttatag tggtgagcct 420

cggacacctg aggttgtggt tgatgagagt tggtggacta gtccagacta ctgcagagaa 480

aagcagctct ggtatgttct ctcaaagaca ttagctgagg atgctgcctg gaagtttgtg 540

aaggagaaag gcattgatat ggttgcaata aatcctgcta tggttattgg tcctttgtta 600

cagcctaccc ttaataccag ttctgctgca gtcttgaact tggtaaatgg tgccgagaca 660

tacccaaatg ctacctttgg gtgggttaat gtcaaagatg ttgcaaatgc acatattctt 720

gcatttgaga acccttcagc taatgggaga tatttgatgg ttgagagagt tgcacactat 780

tctgatatac tgaagatatt acgtgaactt tatcctacaa tgcgacttcc agaaaagtgt 840

gctgatgaca atccattgat gcaaaactat caagtatcaa aagaaagggc aaaaagcttg 900

ggcgttgaat ttactcccct tgaagaaagc atcaaagaaa ctgttgaaag cttgaaggaa 960

aagaagtttt ttggaggctc atctgctatg tga 993

<210> 11
<211> 330
<212> PRT
<213> Lycopersicon esculentum

<400> 11

Met Ser Ser Val Ala Ala Thr Lys Thr Val Cys Val Thr Gly Ala Ser
1 5 10 15

Gly Tyr Ile Ala Ser Trp Leu Val Asn Phe Leu Leu Gln Arg Gly Tyr
20 25 30

Thr Val Lys Ala Ser Val Arg Asp Pro Asn Asp Pro Lys Lys Thr Gln
35 40 45

His Leu Ile Ser Leu Gly Gly Ala Lys Glu Arg Leu His Leu Phe Lys
50 55 60

Ala Asn Leu Leu Glu Glu Gly Ser Phe Asp Ala Val Val Asp Gly Cys
65 70 75 80

Glu Gly Val Phe His Thr Ala Ser Pro Phe Tyr Tyr Ser Val Thr Asp
85 90 95

Pro Gln Ala Glu Leu Leu Asp Pro Ala Val Lys Gly Thr Leu Asn Leu
100 105 110

Leu Gly Ser Cys Ala Lys Ala Pro Ser Val Lys Arg Val Val Leu Thr
115 120 125

Ser Ser Ile Ala Ala Val Ala Tyr Ser Gly Glu Pro Arg Thr Pro Glu
130 135 140

Val Val Val Asp Glu Ser Trp Trp Thr Ser Pro Asp Tyr Cys Arg Glu
145 150 155 160

Lys Gln Leu Trp Tyr Val Leu Ser Lys Thr Leu Ala Glu Asp Ala Ala
165 170 175

Trp Lys Phe Val Lys Glu Lys Gly Ile Asp Met Val Ala Ile Asn Pro
180 185 190

Ala Met Val Ile Gly Pro Leu Leu Gln Pro Thr Leu Asn Thr Ser Ser
195 200 205

Ala Ala Val Leu Asn Leu Val Asn Gly Ala Glu Thr Tyr Pro Asn Ala
210 215 220

Thr Phe Gly Trp Val Asn Val Lys Asp Val Ala Asn Ala His Ile Leu
225 230 235 240

Ala Phe Glu Asn Pro Ser Ala Asn Gly Arg Tyr Leu Met Val Glu Arg
245 250 255

Val Ala His Tyr Ser Asp Ile Leu Lys Ile Leu Arg Glu Leu Tyr Pro
260 265 270

Thr Met Arg Leu Pro Glu Lys Cys Ala Asp Asp Asn Pro Leu Met Gln
275 280 285

Asn Tyr Gln Val Ser Lys Glu Arg Ala Lys Ser Leu Gly Val Glu Phe
290 295 300

Thr Pro Leu Glu Glu Ser Ile Lys Glu Thr Val Glu Ser Leu Lys Glu
305 310 315 320

Lys Lys Phe Phe Gly Gly Ser Ser Ala Met
325 330

<210> 12
<211> 1416
<212> DNA
<213> Lycopersicon esculentum

<400> 12
atgggtagcc tcacacttga aatggatttt gagccatcac ctatgacacc cagaagttta 60

gcagcgatga cacccaaaag tttagcacga cgaagattgt ttccaaatgt ggacaacaaa 120

aaacagaagg tggaacaatc aggcgcaggg ccaaggaaaa acttacaact tgaagtcatg 180

gaaccttctt tgaacaataa tggtccttct ttggacacta tcttggtcaa ttatttggac 240

acacttactc aacgagtcaa ttatcattta ggttatccag tcaacatatg ttatgatcac 300

tatgcatctt tagcaccact tttgcagttt cacctaaaca attgtggtga tcctttccta 360

caaaacactg tcgatttcca ttcaaaagac tttgaagtgg ctgttttgga ttggtttgca 420

aaactatggg aaattgaaaa ggatcaatat tggggatatg ttaccaatgg tggcaccgaa 480

ggcaatctcc atggtatttt gttagggaga gagttacttc ctgaaggaat attatatgca 540

tcaaaagact ctcactactc agtcttcaaa gctgcaagaa tgtatagaat ggattcagaa 600

acaatcaaca catcagtgac tggggagatg gattattcag atttaagagc aaagttactt 660

caaaataagg acaaaccagc tattataaat gtcacaattg gaactacgtt caaaggagca 720

atcgatgacc tggatgttat tcttgaaaca ctcaaagaat gtggctattc acaagatagg 780

ttttacatcc attgtgatgc agcactatgt ggtcttatga ccccttttat aaacaatatg 840

attagtttca agaagccaat tggaagtgtc acaatttctg gtcacaagtt cttaggatgc 900

ccaatgcctt gtggtgtcca aataacaaga aaaagctaca tcaataatct ctcaacaaat 960

gtggaataca ttgcttctgt cgatgccact atttctggta gtcgtaacgg tttgactcca 1020

attttcttat ggtatagctt aagcgcaaaa ggtcaagttg gacttcaaaa ggatgttaaa 1080

agatgtctcg acaatgccaa atatttgaaa aatcgccttc aacaagcagg aataagtgtc 1140

atgttaaatg agcttagcat catagttgta cttgaaaggc ctcgtgacca tgaatttgtg 1200

cgtcgttggc aactttcatg cgtcaaagat atggcacatg ttattgttat gccaggcatc 1260

acccgagaaa tgcttgacaa tttcgtcagt gaactagttc aacaaagaaa acaatggtac 1320

cgagatggaa aagcagaggc tccttgtgtt ggggaggata ttggtgctca aaattgtgca 1380

tgctcttatc ataagattga ttatattggt ccttag 1416

<210> 13
<211> 471
<212> PRT
<213> Lycopersicon esculentum

<400> 13

Met Gly Ser Leu Thr Leu Glu Met Asp Phe Glu Pro Ser Pro Met Thr
1 5 10 15

Pro Arg Ser Leu Ala Ala Met Thr Pro Lys Ser Leu Ala Arg Arg Arg
20 25 30

Leu Phe Pro Asn Val Asp Asn Lys Lys Gln Lys Val Glu Gln Ser Gly
35 40 45

Ala Gly Pro Arg Lys Asn Leu Gln Leu Glu Val Met Glu Pro Ser Leu
50 55 60

Asn Asn Asn Gly Pro Ser Leu Asp Thr Ile Leu Val Asn Tyr Leu Asp
65 70 75 80

Thr Leu Thr Gln Arg Val Asn Tyr His Leu Gly Tyr Pro Val Asn Ile
85 90 95

Cys Tyr Asp His Tyr Ala Ser Leu Ala Pro Leu Leu Gln Phe His Leu
100 105 110

Asn Asn Cys Gly Asp Pro Phe Leu Gln Asn Thr Val Asp Phe His Ser
115 120 125

Lys Asp Phe Glu Val Ala Val Leu Asp Trp Phe Ala Lys Leu Trp Glu
130 135 140

Ile Glu Lys Asp Gln Tyr Trp Gly Tyr Val Thr Asn Gly Gly Thr Glu
145 150 155 160

Gly Asn Leu His Gly Ile Leu Leu Gly Arg Glu Leu Leu Pro Glu Gly
165 170 175

Ile Leu Tyr Ala Ser Lys Asp Ser His Tyr Ser Val Phe Lys Ala Ala
180 185 190

Arg Met Tyr Arg Met Asp Ser Glu Thr Ile Asn Thr Ser Val Thr Gly
195 200 205

Glu Met Asp Tyr Ser Asp Leu Arg Ala Lys Leu Leu Gln Asn Lys Asp
210 215 220

```
Lys Pro Ala Ile Ile Asn Val Thr Ile Gly Thr Thr Phe Lys Gly Ala
225                 230                 235                 240

Ile Asp Asp Leu Asp Val Ile Leu Glu Thr Leu Lys Glu Cys Gly Tyr
                245                 250                 255

Ser Gln Asp Arg Phe Tyr Ile His Cys Asp Ala Ala Leu Cys Gly Leu
            260                 265                 270

Met Thr Pro Phe Ile Asn Asn Met Ile Ser Phe Lys Lys Pro Ile Gly
        275                 280                 285

Ser Val Thr Ile Ser Gly His Lys Phe Leu Gly Cys Pro Met Pro Cys
    290                 295                 300

Gly Val Gln Ile Thr Arg Lys Ser Tyr Ile Asn Asn Leu Ser Thr Asn
305                 310                 315                 320

Val Glu Tyr Ile Ala Ser Val Asp Ala Thr Ile Ser Gly Ser Arg Asn
                325                 330                 335

Gly Leu Thr Pro Ile Phe Leu Trp Tyr Ser Leu Ser Ala Lys Gly Gln
            340                 345                 350

Val Gly Leu Gln Lys Asp Val Lys Arg Cys Leu Asp Asn Ala Lys Tyr
        355                 360                 365

Leu Lys Asn Arg Leu Gln Gln Ala Gly Ile Ser Val Met Leu Asn Glu
    370                 375                 380

Leu Ser Ile Ile Val Val Leu Glu Arg Pro Arg Asp His Glu Phe Val
385                 390                 395                 400

Arg Arg Trp Gln Leu Ser Cys Val Lys Asp Met Ala His Val Ile Val
                405                 410                 415

Met Pro Gly Ile Thr Arg Glu Met Leu Asp Asn Phe Val Ser Glu Leu
            420                 425                 430

Val Gln Gln Arg Lys Gln Trp Tyr Arg Asp Gly Lys Ala Glu Ala Pro
        435                 440                 445

Cys Val Gly Glu Asp Ile Gly Ala Gln Asn Cys Ala Cys Ser Tyr His
    450                 455                 460

Lys Ile Asp Tyr Ile Gly Pro
465                 470
```